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REMARKS

The enclosed is responsive to Examiner's Office Action mailed on January 24, 2007. At the time Examiner mailed the Office Action claims 1-20 were pending. By way of the present response Applicant has: 1) amended no claims; 2) added no new claims; and 3) canceled no claims. As such, claims 1-20 remain pending. Applicants respectfully request reconsideration of the present application and the allowance of all claims now presented. No new matter has been added.

I. Claim Rejections – 35 USC §103

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatstrup et al, US 2004/0243643 (hereinafter "Hatstrup"). Applicant does not admit that Hatstrup is prior art and reserves the right to swear behind either reference at a later date.

a. Overview of Hatstrup

Hatstrup discloses an apparatus and method for managing autonomous third party transfers between a source storage device and a destination storage device. The system described by Hatstrup determines the appropriate segment size for the data transfer based on the data capacity of the data mover and the block boundaries of the destination storage device, and then segments the data blocks accordingly. See Hatstrup, paragraph [0021]. The segment size of the data blocks in Hatstrup must also account for the metadata added to the header. See e.g., Id., paragraph [0077] ("the overall size of the data transfer, including the metadata, is divided by the

determined segment size.”). The metadata is included within the data for identifying and checking data integrity. Id. at paragraph [0012]. The metadata includes a header that identifies the data which may include size information, error-checking, description for the data, a unique identifier, a timestamp, etc. Also, the metadata, in the preferred embodiment includes markers for insertion at predetermined positions within the set of data included in the autonomous operation. Id. at paragraphs [0057-0058].

Hattrup describes a system which inserts the metadata into the data stream before the data is transferred to the destination device for storage. See Hattrup, Fig. 4; paragraphs [0083-0085]. See also Id. at paragraph [0093] (“the formatting rules 408 indicate that a header instruction 402 (H1) is to be inserted, followed by three data block instructions 406 (D1, D2, D3) that are separated by marker instructions 404 (M1 and M2). This procedure is repeated until all the data in the first location 212 is processed.”); Id. at paragraph [0094] (“a formatting rule 408 may require insertion of the metadata 512 first into the destination block 508.”). The Hattrup system then transmits the data stream to the destination device (e.g. tape storage device 110) for backup storage. When the data is to be restored to the original source device, the Hattrup system works in the reverse order to strip off the metadata and restore the original data in its original form. Id. at Fig. 13; paragraphs [0126-0127, 0019].

b. Independent claim 1

The Office Action has rejected independent claim 1 under 35 U.S.C. §103 as unpatentable over Hattrup. However, Applicant submits that Hattrup does not describe what Applicant’s claim 1 requires. Specifically, the combination does not describe all the following limitations:

1. A computer implemented method for storing data comprising:

storing a composite data stream so that it may be restored, said
storing including,

*decomposing the composite data stream into a plurality of
constituent data streams;*

*segmenting at least one of the plurality of constituent data
streams decomposed from the composite data stream; and*

discarding those of the segments resulting from said
segmenting which are determined to have been stored previously.

Applicant submits that claim 1 is patentable over Hattrup for the following independent reasons.

A. Hattrup does not disclose the limitations required by claim 1.

First, the Office Action indicates that Hattrup describes “decomposing the composite data stream into a plurality of constituent data streams. Office Action, p. 3. However, Applicant submits that Hattrup does not describe the above limitation because Hattrup does not decompose the composite data stream prior to storage in the destination storage device. In fact, Hattrup is exactly the prior art system discussed in the background section of Applicant’s specification. See specification, Fig. 1; paragraphs [0003-0004]. Hattrup discloses a third party autonomous backup system which inserts the metadata into the data stream to form the composite data stream and then transmits the composite data stream to the destination device for storage. See e.g., Hattrup, Fig. 4. The destination device then stores both the data and metadata together. When the data is needed, it is restored to the source device by first stripping off the metadata and then transmitting the original data back to the source device in its original form. See e.g., Hattrup, Fig. 13. That is, the metadata is not stripped off until the data is restored back to the source storage device. See Hattrup, page 1, paragraph [0013] (“[b]ecause the users often desire privacy and

security for the data, it is desirable that any backup operations that insert metadata into a user's data stream also remove the metadata and restore the data to its original form."). Nowhere in this process is the additional step taken to "decompose the composite data stream" prior to backup storage as required by claim 1. That is, Hattrup never strips off the metadata (administrative data) prior to transmitting and storing the data in the destination storage device. Hattrup only strips off the metadata when the data is restored to the source storage device. That is, when the backed up data is needed by the original source device. Claim 1, on the other hand, requires the additional step of "decomposing the composite data stream," which, in one embodiment, includes stripping off the metadata before storing to the destination device. As a result, Hattrup describes the typical storage server that stores the entire composite data stream without first decomposing the composite data stream into its constituent data streams (i.e. stripping off the metadata before storage). Accordingly, Applicant respectfully requests withdrawal of the claim rejection.

Also, the Office Action indicates that Hattrup describes "segmenting at least one of the plurality of constituent data streams decomposed from the composite data stream." Office Action, p. 3. However, as discussed above, Hattrup does not decompose the composite data stream prior to storage. As a result, Hattrup cannot segment the decomposed data stream because Hattrup never decomposed the composite data stream into its constituent data streams (i.e. stripping off the metadata before storage). Accordingly, Applicant respectfully requests withdrawal of the claim rejections.

B. The exemplary advantages of claim 1 render a system that complies with claim 1 nonobvious

Finally, the Office Action admits that Hattrup “does not explicitly disclose discarding those of the segments resulting from said segmenting which are determined to have been stored previously.” Office Action, p. 3. Applicant agrees. However, the Office Action argues that “[b]ecause of the motivation to minimize wasted storage space, a person with ordinary skill in the art would have known that segments already stored could be discarded” and “[i]t is for this reason that one of ordinary skill in the art would have been motivated to include discarding those of the segments resulting from said segmenting which are determined to have been stored previously.” Office Action, p. 4. First, Applicant submits that a person having ordinary skill in the art would not have known, based on the Hattrup reference, that segments already stored “could be discarded.” This is because there is no express teaching, motivation, or suggestion in Hattrup to discard segments already stored. Hattrup is focused on storing data blocks in such a way as to minimize the server’s involvement in the process. Hattrup never contemplated what to do with the segments once they reach the storage device.

Even if a person having ordinary skill in the art would have known to discard the segments already stored, Applicant submits the exemplary advantages of a system that complies with claim 1 is a further indication that claim 1 is nonobvious over the cited references. By way of example, existing system that generate composite data streams (such as Hattrup) and segment them for storage typically segment the composite data stream. See spec. at Fig. 7A. As a result, “storage servers that store entire composite data streams are relatively inefficient in that they store large amounts of redundant data.” See spec. p. 4, paragraph [0006]. In contrast, a system that complies with claim 1, in one exemplary embodiment, is useful for storing a composite data stream more efficiently through decomposing the composite data stream first, and then applying

segment reuse to the constituent data streams. An exemplary use that complies with claim 1, therefore, removes the administrative data from such a composite data stream before segmenting the constituent data streams so as to enable better segment matching. This allows segmenting to work better as illustrated in spec. at Fig. 7B. While the claim is not limited to the system shown in Fig. 7B, it is capable of enabling it. As a result, Applicant submits that the exemplary advantages of a system that complies with claim 1 renders the claim nonobvious over the cited art because it allows for enhanced segment matching resulting in more efficient backup storage. Accordingly, Applicant submits that claim 1 is patentable over Hattrup and respectfully requests withdrawal of the claim rejection.

II. Claim Rejections – 35 USC §103

Claims 7-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hattrup in view of Athicha Muthiatacharoen, Benjie Chen and David Mazieres "A Low-bandwidth Network File System", MIT Laboratory for Computer Science and NYU Department of Computer Science (hereinafter "Muthiatacharoen"). Applicant does not admit that Muthiatacharoen is prior art and reserves the right to swear behind the reference at a later date.

a. Overview of Muthiatacharoen

The system in Muthiatacharoen is about reducing bandwidth in a network file storage system. Muthiatacharoen describes a client-server system that utilizes segment reuse to take advantage of commonality between files on a file storage network. In Muthiatacharoen, traffic across the network can be reduced when a client checks out a file from the server because in such a system there is a lot of commonality between files. When a particular client checks out a file,

the server only sends the segments of that file across the network that have been changed since the client last checked the file out. Thus, the Muthiatacharoen system cross-checks the segments of files stored on the server with those segments in the client's cache memory to increase bandwidth efficiency in a network file storage system. See Muthiatacharoen at p. 5, sec. 3.2.1.

b. Independent claim 7

The Office Action has rejected independent claim 7 under 35 U.S.C. §103 as unpatentable over Hatstrup in view of Muthiatacharoen. However, Applicant submits that the combination of Hatstrup and Muthiatacharoen does not describe what Applicant's claim 7 requires. Specifically, the combination does not describe all the following limitations:

7. A computer implemented method for efficiently storing data comprising:

receiving over time a plurality of composite data streams, said plurality of composite data streams representing snapshots of data residing at a set of one or more sources taken over said time; and

storing each of said plurality of composite data streams so that it may be restored, said storing including,

decomposing the composite data stream into a plurality of constituent data streams; and

storing using segment reuse a set of one or more of said plurality of constituent data streams, said storing using segment reuse including performing the following for each of said set of constituent data streams,

segmenting the constituent data stream, and

storing only those segments of the constituent data stream that cannot be restored using segments already stored as a result of storing a previous one of said plurality of composite data streams.

Applicant submits that claim 7 is patentable over Hattrup for the following independent reasons.

First, as discussed above, Hattrup fails to disclose “decomposing the composite data stream into a plurality of constituent data streams.” Accordingly, Applicant respectfully requests withdrawal of the claim rejection.

Second, as discussed above, Hattrup fails to disclose “segmenting the constituent data stream” because Hattrup does not decompose the composite data streams into its constituent data streams prior to storage. Accordingly, Applicant respectfully requests withdrawal of the claim rejection.

Third, even if Hattrup and Muthiatacharoen are combined in the way the Office Action asserts, the combination would not read on claim 7. The Office Action indicates that “Muthiatacharoen teaches storing using segment reuse a set of one or more of said plurality of constituent data streams...” Office Action, p. 8. However, Applicant submits that although Muthiatacharoen discloses using something similar to segment (block) reuse, Muthiatacharoen cannot apply its segment reuse to the “constituent data streams” because neither Hattrup nor Muthiatacharoen disclose “decomposing the composite data stream into a plurality of constituent data streams.” As a result, Muthiatacharoen can only be applied to the composite data stream (i.e. the non-decomposed data stream) provided by Hattrup. Therefore, Applicant submits that even if Hattrup and Muthiatacharoen are combined in the way the Office Action asserts, the combination would not read on claim 7 because neither reference, individually or in combination, discloses decomposing the composite data stream. Accordingly, Applicant respectfully requests withdrawal of the claim rejections.

Finally, as discussed above with respect to claim 1, the exemplary advantages of a system that complies with claim 7 renders the claim nonobvious over the cited art. Accordingly, Applicant respectfully requests withdrawal of the claim rejections.

c. Independent claim 12

The Office Action has rejected independent claim 12 under 35 U.S.C. §103 as unpatentable over Hattrup in view of Muthiatacharoen. However, Applicant submits that the combination of Hattrup and Muthiatacharoen does not describe what Applicant's claim 12 requires. Specifically, the combination does not describe all the following limitations:

12. A computer implemented method for storing data comprising:
storing a composite data stream so that it may be restored, said
storing including,

*decomposing the composite data stream into a plurality of
constituent data streams; and*

*backing up each of said plurality of constituent data
streams separately, said backing up including,*

*applying segment reuse to back up a first set of
one or more of said plurality of constituent data streams.*

Applicant submits that claim 12 is patentable over Hattrup for the following independent reasons.

First, as discussed above, Hattrup fails to disclose "decomposing the composite data stream into a plurality of constituent data streams." Accordingly, Applicant respectfully requests withdrawal of the claim rejections.

Second, in accordance with the above arguments, because Hattrup fails to disclose "decomposing the composite data stream" Hattrup cannot disclose "backing up each of said plurality of constituent data streams separately" and the combination of Hattrup and Muthiatacharoen, cannot disclose "said backing up including, applying segment reuse to back up

a first set of one or more of said plurality of constituent data streams.” Accordingly, Applicant respectfully requests withdrawal of the claim rejections.

Finally, as discussed above with respect to claim 1, the exemplary advantages of a system that complies with claim 12 renders the claim nonobvious over the cited art. Accordingly, Applicant respectfully requests withdrawal of the claim rejections.

d. Independent claim 15

The Office Action has rejected independent claim 15 under 35 U.S.C. §103 as unpatentable over Hattrup in view of Muthiatacharoen. However, Applicant submits that the combination of Hattrup and Muthiatacharoen does not describe what Applicant’s claim 15 requires. Specifically, the combination does not describe all the following limitations:

15. (Original) An apparatus to back up data comprising:

an interface agent to receive over time composite data streams representing snapshots of data residing at a set of one or more sources;

a composite data stream decomposer/recomposer, coupled to said interface agent, to decompose composite data streams into their constituent data streams, and to recompose composite data streams from their constituent data streams; and

a segment reuse storage system, coupled to said composite data stream decomposer/recomposer, to store and restore constituent data streams.

Applicant submits that claim 15 is patentable over Hattrup for the following independent reasons.

First, as discussed above, Hattrup fails to disclose “decomposing the composite data stream into a plurality of constituent data streams.” So, Hattrup cannot disclose any apparatus such as the claimed “composite data stream decomposer/recomposer.” Accordingly, Applicant respectfully requests withdrawal of the claim rejections.

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Second, because the composite data stream is never decomposed into its constituent data streams, the combination of Hattrup and Muthiatacharoen, individually or in combination, cannot possible read on the limitations "a composite data stream decomposer/recomposer, coupled to said interface agent, to decompose composite data streams into their constituent data streams," and "a segment reuse storage system, coupled to said composite data stream decomposer/recomposer, to store and restore constituent data streams." Accordingly, Applicant respectfully request withdrawal of the claim rejections.

Finally, as discussed above with respect to claim 1, the exemplary advantages of a system that complies with claim 15 renders the claim nonobvious over the cited art. Accordingly, Applicant respectfully request withdrawal of the claim rejections.

e. Other Dependent Claims

Additionally, given that the remaining claims in this present application each depend from one of the above independent claims, either directly or indirectly, Applicant submits that for reasons similar to those discussed above, the remaining claims are patentable over the above references, individually or in combination. Accordingly, Applicant respectfully requests withdrawal of the claim rejections.


III. CONCLUSION

Applicant respectfully submits that all rejections have been overcome and that all pending claims are in condition for allowance.

If there are any additional charges, please charge them to our Deposit Account Number 02-2666. If a telephone conference would facilitate the prosecution of this application, Examiner is invited to contact Matthew W. Hindman at (408) 720-8300.

Respectfully Submitted,
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